Reforestation Standard of Alberta
Sample Selection Tool User's Manual

May 2015

Printed documents are not controlled.

For a digital copy of this document, visit the ESRD website and use the following search term: "RSA Sample Selection Tool".

- esrd.alberta.ca

© 2015 Government of Alberta

Suggested citation:

Alberta Environment and Sustainable Resource Development. 2015. *Reforestation Standard of Alberta, RSA Sample Selection Tool User's Manual*. Government of Alberta, Department of Sustainable Resource Development, Edmonton, Alberta. 10 p.

Inquiries regarding this document should be directed to:

Alberta Environment and Sustainable Resource Development
Forestry and Emergency Response Division
Forest Management Branch
Forest Program Management Section
7th Floor, Great West Life Building
9920 108 Street
Edmonton, Alberta

Tel: 780.427.8474
Website: esrd.alberta.ca

General Disclaimer

Inclusion in this document of the name of any trade designation, equipment, supplier, consultant, or contractor does not constitute an endorsement of that trade designation, equipment, supplier, consultant, or contractor to the exclusion of any other.

© 2015 Government of Alberta

Table of Contents

1. Scope 5
2. General process 5
3. Installation 5
4. Usage 6
   4.1 Pre Sample Selection Data Preparation 7
   4.2 Clear Data 8
   4.3 Validate Input Data 8
   4.4 Modify Sample Size 8
   4.5 Generate Population Stats 9
   4.6 Select Sample 9
   4.7 Calculate Inclusion Probabilities 10
   4.8 Output Data 10
   4.9 About 10

List of Figures

Figure 1. Security warning in Microsoft Excel 2007 6
Figure 2. Location of the Sample Selection menu in Microsoft Excel 2007 6
Figure 3. Validation of input data 8
Figure 4. Sample Selection summary example (some fields are not shown here) 9
Figure 5. RSA Sample Selection Tool Information Page 10

© 2015 Government of Alberta

1. Scope

This manual only details matters related to the installation and usage of the Reforestation Standard of Alberta (RSA) Sample Selection software tool (SST)[1]. This version of the RSA SST User's Manual supersedes the previous version of the RSA SST User's Manual.

A detailed description of the Reforestation Standard of Alberta (RSA) sample selection process can be found in the approved RSA, which can be viewed and/or downloaded by visiting the ESRD website and using the following search term: "Reforestation Standard of Alberta".

- esrd.alberta.ca

The chief modifications from previous versions are 1) the removal of lumping of rare strata and 2) a switch to random sampling within each of the Alberta Planning Standard Base-10 species strata. The Monte Carlo calculation of inclusion probability for each sample unit has been replaced by this random selection process. However, the use and format of the SST is essentially unchanged.

2. General Process

The general overview of the RSA SST process is described below.

1. **Install the RSA SST and the RSA Compiler**. Installation instructions for the RSA SST are provided below. Installation instructions for the RSA Compiler are provided in the RSA Compiler User's Manual, which can be viewed and/or downloaded by visiting the ESRD website and using the following search term: "RSA Compiler".
2. **Import and validate the master opening (Opening1 or O1 dataset) and polygon (Interp1 or I1 dataset) lists into the RSA Compiler**. Once the user is satisfied that the population is correct and no errors or warnings remain then export the master polygon dataset (Interp1 or I1 dataset) from the RSA compiler for use in the RSA SST.
3. Open the RSA SST and **Clear Data** to ensure the user is starting with a clean set of worksheets.
4. Bring in the master polygon list, from above, to the input data worksheet and **Validate Input Data**.
5. **Generate Population Statistics** and review the resulting population statistics.
6. **Select Sample** and review the resulting sample.
7. **Generate Inclusion Probabilities** and review the inclusion probability worksheet.
8. **Output Data** into a standardized SST output file for future processing.

3. Installation

The RSA SST was developed and tested for Microsoft Excel 2002 and newer versions.
To determine the user's version of Microsoft Excel, follow the menu: **Help → About Microsoft Office Excel.**
If the user cannot find the Help item on their menu, then they most likely have the latest version: Microsoft Excel 2007.[2]

The installation and usage of the RSA SST is identical for Microsoft Excel 2003 and earlier versions. However, Microsoft Excel 2007 was a major upgrade in both interface and internal architecture, therefore whenever warranted, a short section detailing the difference is provided.

[1] We acknowledge Gyula Gulyas, TECO Natural Resource Group Ltd., who assisted with the development of this Microsoft Excel version of the RSA SST.

[2] As an alternative, the user can also open a new Microsoft Excel file and type the following formula into any blank cell: =INFO("release"). The formula returns the Microsoft Excel version number. If the version is 12.0 or higher, then the user has Microsoft Excel 2007.

© 2015 Government of Alberta

The RSA SST does not require any special installation in Microsoft Excel 2002-2003. Upon opening the file, the user must make sure to **Enable Macros**.

Microsoft Excel 2007

Unless the file is located in one of the Microsoft Excel Trusted Locations, the user will get a Security Warning upon opening the file that is very difficult to notice. The warning is located above the formula bar and looks like the image in Figure 1.

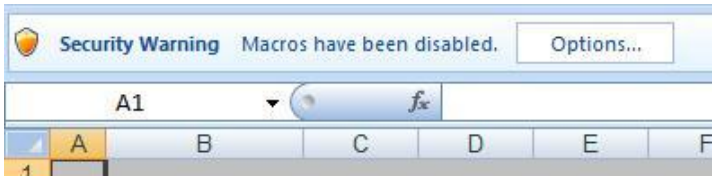

Figure 1. Security warning in Microsoft Excel 2007

Click the **Options…** button and check **Enable this content…** so that the macros will execute.

Note that the user may need to update their Microsoft Excel 2007 program with the Microsoft Office 2007 Service Pack 3 that has some significant bug fixes and other upgrades.

The SP3 update can be found at the following website:

http://www.microsoft.com/en-us/download/details.aspx?id=27838

4. Usage

Upon opening the RSA SST, a new menu item called **Sample Selection** will be installed to the left of the **Help** menu item in Microsoft Excel 2002-2003.

Microsoft Excel 2007

The **Sample Selection** menu is located under the **Add-Ins** menu item as shown in Figure 2.

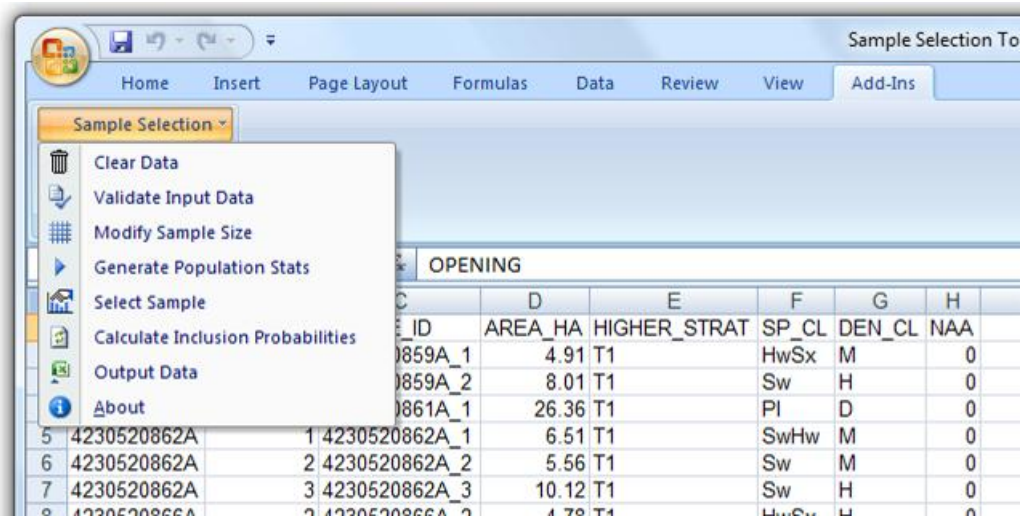

Figure 2. Location of the Sample Selection menu in Microsoft Excel 2007

© 2015 Government of Alberta

There are ten visible worksheets in the RSA SST:

1. Sample_Size – used to define target sample size by species composition class stratum. The user only needs to visit this sheet if they want to increase their target sample size above those provided as minimums by the RSA SST.
2. Input_Data – used to enter the raw population data.
3. SU_Data – Sampling unit data generated by the Generate Population Stats menu item.
4. List_of_Openings – The list of openings generated by the Generate Population Stats menu item.
5. Pop_Summary_Stats – Population summary statistics generated by the Generate Population Stats menu item.
6. Strata – Original strata summaries. This is also generated by the Generate Population Stats menu item.
7. Final_Strata – Finalized strata summary generated by the Generate Population Stats menu item.
8. SU_SAMPLE_LIST – The list of selected samples generated by the Select Sample menu item.
9. SELECTION_SUMMARY – Summary statistics of the selected samples generated by the Select Sample menu item.
10. INCLUSION_PROB – Inclusion probabilities for each sampling unit. This list is generated by the Calculate Inclusion Probabilities menu item. Formerly, a 5000-sample Monte-Carlo simulation was run to generate these when sampling of adjacent polygons was permitted. This is no longer necessary under random sampling; however, for compatibility with the RSA Compiler, the cells in the "total_runs" and "num_sel" columns are auto-populated with the value 5000. The cells in the "sel_weight" column is also auto-populated with the value 1, denoting random selection.

The Input_Data worksheet is used to enter data and the Sample_Size worksheet is used to define the target sample size; all other worksheets are used to store output data and should not be manipulated.

There are eight items that can be found on the **Sample Selection** menu:

1. Clear Data
2. Validate Input Data
3. Modify Sample Size
4. Generate Population Stats
5. Select Sample
6. Calculate Inclusion Probabilities
7. Output Data
8. About

These menu items are described in detail below.

4.1 Pre Sample Selection Data Preparation

Before providing data to the RSA SST, the user must be sure the population of openings and the corresponding Sampling Unit (polygon) information is correct. The RSA Compiler is designed to help with this process. The user should first import the master opening (Opening1 dataset) and polygon (Interp1 dataset) lists into the RSA Compiler. Once imported, a validation must be conducted on these datasets. Any errors and warnings should then be addressed. Once the user is satisfied the population is correct and no errors or warnings remain, then the master polygon dataset (Interp1 or I1 dataset) can be exported from the RSA Compiler for use in the RSA SST. This exported master polygon data should be the basis for the input data into the RSA SST.

© 2015 Government of Alberta

4.2 Clear Data

The **Clear Data** menu item is used to clear out the data from the Input_Data worksheet and all other output worksheets.

The user should always use **Clear Data** BEFORE entering a new population. This will ensure that the user starts the sample selection process with a clean set of worksheets.

4.3 Validate Input Data

The **Validate Input Data** menu item is used to validate the raw input data entered by the user. The validation first checks if all required fields are present in the data and are named according to the Interp1 data dictionary, as described in the RSA.

The eight (8) required fields are: OPENING, POLYGON, UNIQUE_ID, AREA_HA, HIGHER_STRAT, SP_CL, DEN_CL, and NAA.

The RSA SST has a set of validation rules that will identify duplicate polygon records, misspelled or missing codes, blank polygon numbers just to name a few. These validation rules are included to assist users in ensuring the RSA SST runs properly and meaningfully[3]. The errors are identified and highlighted. The data cell will also have an embedded comment to indicate the type of error found, as shown in Figure 3. The header of the field in error is also highlighted to ensure visual identification in case the cell in error is at the bottom of the data sheet.

Validation is an iterative process that requires the fixing of errors and re-validation until no errors are reported.

The user must always start the data in the upper left corner cell (A1). The top row must contain the field names and should not have embedded blank cells.

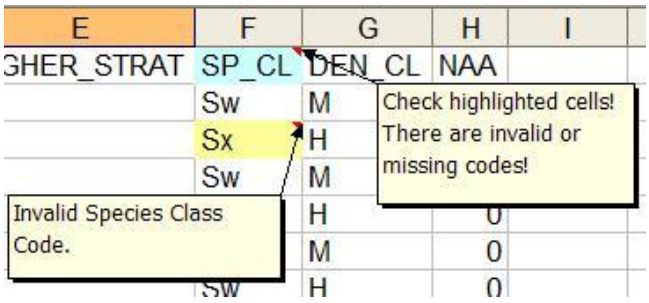

Figure 3. Validation of input data

Prior to data input into the RSA SST, users are encourage to import their Opening 1 (O1)and Interp1 (I1) data into the RSA Compiler, which has an extensive data and relational validation feature. O1 and I1 data validated and deemed clean in the RSA Compiler, should import into the RSA SST error free.

4.4 Modify Sample Size

The **Modify Sample Size** menu item allows the user to modify the target sample size. The user can specify the desired sample size for each of the base 10 species composition class strata. Target sample sizes must meet or

[3] These validation rules do not constitute an audit of the input data. The timber disposition holder is responsible for ensuring that all data is complete and accurate.

© 2015 Government of Alberta

exceed the minimum described in the RSA. A reset button is available to reset the specified sample sizes to the defaults or RSA minimums.

4.5 Generate Population Stats

The **Generate Population Stats** menu item is used to generate the population statistics and list the openings and sampling units. This step cannot be completed until the input data are validated and cleaned.

Upon successful completion of this step, the process will populate the following five worksheets: SU_Data, List_of_Openings, Pop_Summary_Stats, Strata, and Final_Strata.

The user should always review the population summary statistics and stratification information as these contain crucial information for the subsequent sample selection process.

4.6 Select Sample

The **Select Sample** menu item is used to select the Sample. This step cannot be completed unless the data was validated, cleaned and the **Generate Population Stats** step was run.

Depending on the size of the population this step could take as long as a couple of minutes, however in most cases the samples are selected in less than one minute. The Microsoft Excel status bar will indicate the number of iterations and the number of strata left to be sampled during the run.

The sample selection process is based on a pre-determined random sequence. Re-running the process several times within a given month and year will always yield identical results for the same population.

Upon successful completion of this step, the process will populate two worksheets: SU_SAMPLE_LIST and SELECTION_SUMMARY.

The SU_SAMPLE_LIST worksheet contains the actual sample by strata. There are contingency sampling units for each stratum in addition to the minimum sample size required[4].

The SELECTION_SUMMARY worksheet provides a summary of the areas and plots sampled as they compare to the population. The summary is reported by the final strata, as shown in Figure 4.

Final_Strata	HIGHER_STRAT	sp_cl_strata	Area (ha)	Polygons	Sample_size	su_sampled	area_sampled	plots_sampled	status
0_Hw	0	Hw	134.06	15	10	10	90.47	444	COMPLETE
0_HwSx	0	HwSx	261.56	21	15	15	135.46	616	COMPLETE
0_PlHw	0	PlHw	3.14	1	15	1	3.14	32	CENSUS
0_Sb	0	Sb	56.75	6	15	6	47.3	228	CENSUS
0_SbHw	0	SbHw	5.33	1	15	1	5.33	32	CENSUS
0_Sw	0	Sw	6.21	1	10	1	6.21	32	CENSUS
0_SwHw	0	SwHw	59.45	7	15	7	52.45	265	CENSUS
Grand Total			***526.5***	***52***		***41***	***340.36***	***1649***	

Figure 4. Sample Selection summary example

[4] There are no contingency sample units in cases where the number of sampling units in a stratum is less than or equal to the minimum sample size (STATUS=CENSUS).

© 2015 Government of Alberta

4.7 Calculate Inclusion Probabilities

The **Calculate Inclusion Probabilities** menu item is used to generate the inclusion probabilities for all sampling units[5]. The sample design for Performance surveys completed using the Aerial Stratification System is stratified random. Thus, the need for the Monte Carlo simulation and sampling unit specific inclusion probabilities is no longer required. However, the RSA Compiler requires the cells in the "total_runs", "number_sel", and "sel_weight" columns be populated. Thus, by running the Calculate Inclusion Probabilities the cells in the "total_runs" and "number_sel" columns are set to 5000 and the cells in the "sel_weight" are set to one (1) in all cases.

4.8 Output Data

The **Output Data** menu item is used to output the Sample Selection data for submission. The default file name is "Sample_" followed by the current date in YYYYMMDD format (for example, Sample_20140830.xls). Ensure that all steps are completed, as described above.

The contents of the output file are a reporting requirement, as outlined in the RSA. This Excel file is also required as an input to the RSA Compiler for determining stratum MAI for the Aerial Stratification System.

4.9 About

The **About** menu item shows the information window presented in Figure 5.

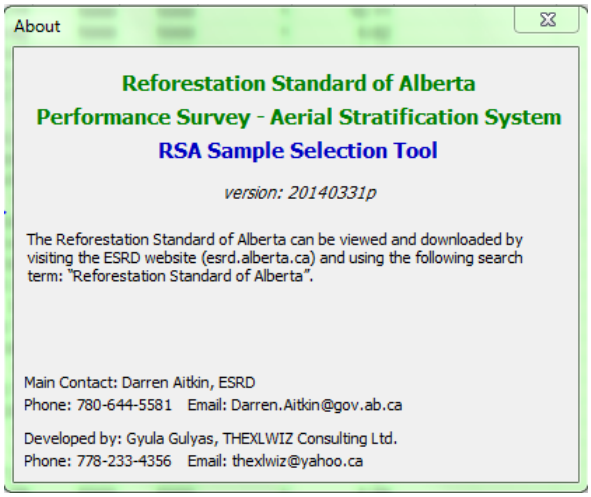
About
Reforestation Standard of Alberta
Performance Survey - Aerial Stratification System
RSA Sample Selection Tool
version: 20140331p
The Reforestation Standard of Alberta can be viewed and downloaded by visiting the ESRD website (esrd.alberta.ca) and using the following search term: "Reforestation Standard of Alberta".
Main Contact: Darren Aitkin, ESRD
Phone: 780-644-5581 Email: Darren.Aitkin@gov.ab.ca
Developed by: Gyula Gulyas, THEXLWIZ Consulting Ltd.
Phone: 778-233-4356 Email: thexlwiz@yahoo.ca

Figure 5. RSA Sample Selection Tool Information Page

[5] An estimate of the inclusion probability for each sampling unit and area-weighting are necessary for compiling MAI results from the sampling unit level to the sampling stratum level.

© 2015 Government of Alberta